

### ABSTRACT

An antimicrobial cleaning composition and methods for cleaning semiconductor substrates, particularly after chemical mechanical planarization or polishing, are provided. In one embodiment, the cleaning composition combines a solvent, a cleaning agent such as a hydroxycarboxylic acid or salt thereof, and at least one antimicrobial agent resulting in a cleaning composition in which microbial growth is inhibited. Examples of suitable antimicrobial agents include a benzoic acid or salt such as potassium or ammonium benzoate, and sorbic acid or salt such as potassium sorbate. The composition is useful for cleaning a wafer and particularly for removing residual particles after a conductive layer has been planarized to a dielectric layer under the conductive layer in a chemical mechanical planarization of a semiconductor wafer with abrasive slurry particles, particularly after a CMP of copper or aluminum films. Use of the cleaning composition advantageously inhibits microbial growth in the cleaning solution and deposition on the cleaned planarized surface.